Center Innovation Fund: ARC CIF

Critical 2D-to-3D Transformation of NASA's VESGEN Software for Astronaut Health Countermeasures and Terrestrial Medicine/Ecological Commercialization

Completed Technology Project (2015 - 2016)

Project Introduction

The challenge is to map and quantify 3D vascular remodeling in critically important tissues such as the astronaut and diabetic retina and mouse gastro-intestinal tract (GI) that display translational (not rotational) geometry. Innovative 3D maps of vascular patterning by VESGEN software move beyond the 2D 'branching flatland' into the vast majority of real world applications important to astronaut and terrestrial human health. VESGEN 3D will map vascular branching by dissecting these complex, fractal-based structures according to key insights derived from physiological vascular branching rules. VESGEN quantification of 3D vascular maps will support evidence-based decisions for space and terrestrial medical imaging and therapeutic development such as drug discovery.

Anticipated Benefits

VESGEN 3D as Innovative Research & Discovery Tool for advances in: 1) Astronaut health countermeasures for established risks such as Visual Impairments Associated with Increased Intraocular Pressure (VIIP). 2) Improved understanding for better targeting of vascular therapies for diabetic retinopathy and cancer. Grant and Project funding by NASA Life Sciences, ExMC HRP, NIH. Licensing by imaging and drug development companies. Rotational 3D geometry in more complex organs. Potential customers and Applications: NASA Space Life Sciences (ISS and beyond); ExMC HRP; Space Radiation; US National Institutes of Health; Imaging Companies (Zeiss, Optovue, Heidelberg Engineering); Drug Discovery Companies (Genentech, Pfizer)

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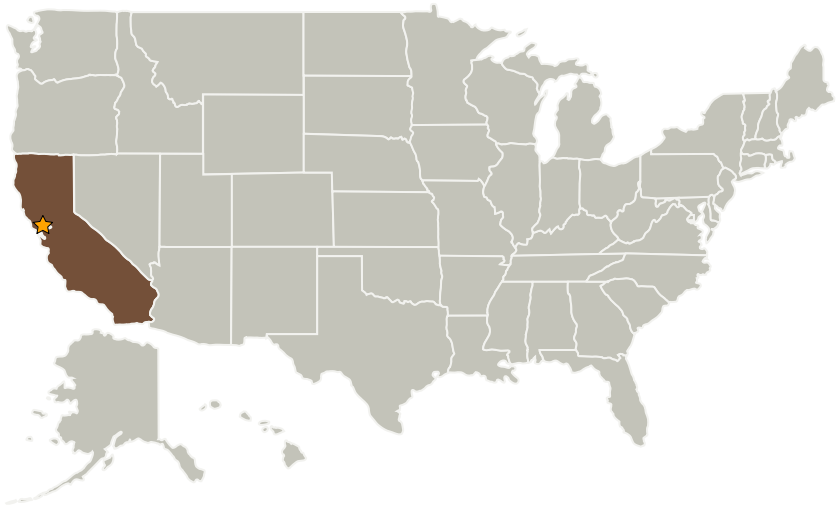
Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★Ames Research Center(ARC)	Lead Organization	NASA Center	Moffett Field, California

Primary U.S. Work Locations
California

Project Website:

https://www.nasa.gov/directorates/spacetech/home/index.html

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Ames Research Center (ARC)

Responsible Program:

Center Innovation Fund: ARC CIF

Project Management

Program Director:

Michael R Lapointe

Program Manager:

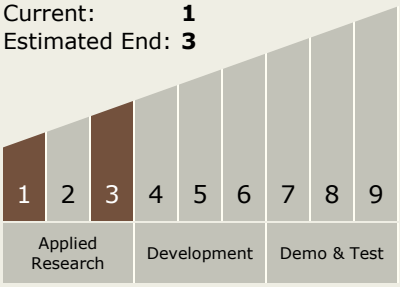
Harry Partridge

Principal Investigator:

Patricia A Parsons-wingerter

Technology Maturity (TRL)

Start: **1**
Current: **1**
Estimated End: **3**



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Technology Areas

Primary:

- TX06 Human Health, Life Support, and Habitation Systems
  - TX06.3 Human Health and Performance
    - TX06.3.3 Behavioral Health and Performance